Space Weather Forecast

Issued on Sunday, 12 November 2023 at 01:20 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: G1 to G2 Minor to Moderate geomagnetic storm expected day 1 (12 Nov), chance G3 Strong geomagnetic storm at peak. Associated increase in auroral activity.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity is at Moderate levels with a solitary Moderate class flare observed from a region in the far southwest of the disc. There are four sunspot regions on the disc, the largest located in the northwest, with moderate complexity. The remaining three regions, all in the southwest are significantly smaller and remain magnetically simple at this time.

A filament eruption (arc of plasma lifting off the Sun's surface) was also observed to have lifted-off the northwest quadrant around 11/0600UTC, which has produced a Coronal Mass Ejection (CME). The event is awaiting analysis for any potential Earth-directed component, though it appears unlikely. No other Earth-directed CMEs have been observed in the past 24 hours.

Solar Wind / Geomagnetic Activity: Solar winds overall are felt to be reflective of the waning enhancement from a fast wind regime stemming from a 'coronal hole'.

Solar wind speeds fell from elevated to slightly elevated levels, while the number of particles comprising the wind increased from below to slightly above average levels. The associated magnetic field was steady and comfortably within background, with a varying and small-scale north-south component. The net result of the above solar wind measures was for Quiet (Kp 0-2) geomagnetic activity.

Energetic Particles / Solar Radiation: Solar radiation levels remained at background levels.

Four-Day Space Weather Forecast Summary

Solar Activity: Low to Moderate, with a chance of further isolated Moderate-class flares on days 1 and 2 (12 and 13 Nov), reducing to a slight chance on days 3 and 4 (14 and 15 Nov).

Solar Wind / Geomagnetic Activity: Solar winds are currently at slightly elevated levels following the recent high-speed stream from a coronal hole, with Quiet geomagnetic conditions. The geomagnetic forecast is dominated by the imminent arrival of the 09 Nov full halo CME, currently forecast to arrive early day 1 (12 Nov). G1 to G2 Minor to Moderate geomagnetic storms are expected at peak, with a chance of G3 Strong geomagnetic storm conditions, easing down into day 2 (13 Nov). Geomagnetic activity should return to mainly Quiet levels following this within a broadly slow-ambient solar wind regime.

UK Aurora Forecast: Aurora may be visible in parts of Scotland and Northern Ireland during the early hours of Sunday morning (12 Nov) perhaps as far south as northern England and Wales. Confidence then lowers into the new working week, as although quieter conditions are forecast, with no significant enhancements to the auroral oval expected.

Energetic Particles / Solar Radiation: There is a daily very slight chance of S1 or greater radiation storm conditions should any of the western solar hemisphere sunspot groups produce significant flares in the period. This risk should begin to wane from the start of the next working week as these sunspots progress onto the far side.

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Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	90	20	1	5
Strong	G3	No	30	1	1	1
Severe	G4	No	5	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	25	25	15	5
Very Active	R3 to R5 X	No	1	1	1	1

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	10	10	5	5
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

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